Sixteenth Meeting of the Cross Polar Trans East Air Traffic Management Providers' Work Group (CPWG/16)

(Ottawa, Canada 3-6 December 2013)

Agenda Item 8: Communications, Navigation, Surveillance (CNS) and Air Traffic Management (ATM) issues

Case Study of Recent Volcanic Activity caused Re-Routes

(Presented by Ray Howland, American Airlines)

SUMMARY

This paper presents information regarding the eruption of the Kliuchevskoi Volcano 16 October 2013, SIGMETS issued in response to the eruption, actions taken by various ANSPs, and the resulting actions taken by airlines for airborne flights.

1 Introduction

1.1. On October 16, 2013 at 0515Z, Kliuchevskoi Volcano on the Kamchatka Peninsula erupted with ash levels forecasted to reach FL280.

1.2. Subsequent advisories issued by Tokyo VAAC and VA SIGMETs issued by a contract weather information provider caused a concern of possible greater impact than originally anticipated. This caused a revision to the Pacific tracks 10 degrees south of their original location.

2 Discussion

2.1. At 1100Z on 16 October the AAL Dispatcher coming on duty to work the Pacific flights reviewed the SIGMETS and VAAC Advisories associated with volcanoes on the Kamchatka Peninsula. He knew that they had been somewhat active in the days prior and was concerned about any potential impact to the westbound Asian operation. The SIGMET was for ash up to FL250 in the immediate vicinity of the volcano. The current advisory and graphic from the Tokyo VAAC indicated ash up to FL230 as far south as 50N (just south of the Aleutians) by 1700Z, and down to about 46N at FL280 by 2300Z. Since the latest info was almost six hours old, he called the Enroute Forecaster at WSI (the AAL weather information provider) to discuss the situation. His thinking was that the any ash concentration that could impact us operationally would remain at around FL260 and stay north the Aleutians. He asked if staying south of the Aleutians would keep flights clear of any high ash concentrations though about 0600Z/17, and he indicated that would work.

2.2. At 1406Z he issued the release for AAL175 DFW-NRT on the following route utilizing PACOT – F: KDFW FERRA5 PNH J58 MLF/N0484F340 DCT FMG DCT RBL DCT LINUZ DCT MITOH DCT EDWIL/M084F360 DCT 46N140W 48N150W 48N160W 46N170W 42N180E 38N170E 36N160E 35N150E DCT MORAY/N0481F400 OTR15 SMOLT Y815 KETAR Y811 MELON PIXUS RJAA

2.3. A new Volcanic Ash Advisory was issued by Tokyo at 1200Z showing ash up to FL320 extending down as far as 39N by 0515Z/17. New WSI SIGMET and FPG (Flight Planning Guidance) data matched with what the Dispatcher had discussed with the forecaster earlier. AAL procedure is to plan using the

WSI data. At the time there was no WSI, or government SIGMET, for ash south of 50N. The idea was that the any ash south of 50N would be diffuse enough as to not have an impact on aircraft operations and that it wouldn't be any higher than FL320. AA175 was planned at FL360 across the area, which was above the 2000ft buffer procedurally allowed for the 777 to overfly even a WSI VA SIGMET. At this point I planned to keep an eye on things but continue with the plan.

2.4. About 30 minutes after AA175 took off from DFW (1549Z), the Dispatcher was called over to our ATC desk to participate in an ad-hoc conference call with ATCSCC, Anchorage Center, Oakland Center and other carriers about the volcanic ash situation in the Pacific. The discussion was around whether or not to amend the Pacific tracks further south (about 10 degrees). Anchorage indicated that while they thought that the ash concentrations would remain below acceptable limits on the current tracks, the lack of visible satellite data (it had been dark in the affected area for several hours) caused them a bit of concern. The decision was made to amend the tracks about 10 degrees south of their previous location. In the meantime WSI had also issued a SIGMET for moderate turbulence above FL320 across the PACOTS right in the area where the ash was forecast.

2.5. At this point AAL175 was about 45 minutes into their flight approaching FTI (Fort Union, New Mexico). It was going to be at least 30 minutes before the new PACOTS were going to be issued. So the Dispatcher built a route that followed what had already been flown and connected it to a route that would take the flight through Russia upwind of the eruption. Running a flight plan came up with an arrival fuel of about 12,500lbs (a little over an hour of fuel). The Dispatcher then called the flight on SATCOM to discuss the situation.

2.6. The Dispatcher gave the crew a quick description of the situation regarding the ash and turbulence along the current route and said that while continuing as planned was an option, another way to go was to reroute via Russia, but that fuel would be tight on arrival. They concurred with the reroute. The Dispatcher then amended their destination to CTS with an alternate of HKD, and to expect a re-dispatch on to NRT over the point PAKLI if the fuel remaining allowed it. The Dispatcher also advised that he would have the complete route and fuel info to them in a couple of minutes but that they should go ahead and get with ATC and start working their way towards GTF (Great Falls Montana) or BIL (Billings Montana).

2.7. The Dispatcher then went ahead and issued a new dispatch release at 1655Z, and transmitted the new flight plan to ATC for the new route: KDFW FERRA5 PNH DCT FTI DCT GTF J569 YNY/N0482F360 J569 YYD DCT SSR J541 YAK J501 TED J111 OME DCT KUTAL B233 DIMUR/N0489F400 B233 BUMAT/M083F400 B233 ODORA B337 ANIMO/N0488F400 B337 AWE V7 CHE DCT TOBBY Y10 LARCH Y302 JUGEM Y30 MELON PIXUS RJAA

2.8. The Dispatcher sent the entire new release/flight plan to the aircraft via ACARS and started calling ATC Centers to follow up on the route. The TMU at Anchorage said that they had received the new plan and he also received an acknowledgement via AFTN from Russian MATFM.

2.9. Due to automation issues within the US, neither of the domestic ATC Centers had received the new flight plan. The Flight Crew was required to work out the new routing with the ATC Controller working the flight at the time. It took the Flight Crew 30-45 minutes to work out the final routing up through Canada with ATC. At the same time, Fort Worth Center called the Dispatcher to report that they had received a message from ATC in Japan indicating they had received an FPL, a departure message, and then a CNL followed by a second FPL. Again, automation issues both within AAL and US ATC were the cause of this sequence of messages. The Dispatcher explained to the ZFW Supervisor what was happening and asked that he send a message back to Japan stating that they should keep the second FPL.

2.10. ATC was able to provide clearance on some requested “shortcuts” that allowed the flight to save fuel and complete the flight all the way to NRT without further problems.

2.11. All other AAL flights were planned to avoid the ash area in the pre-planning phase and were not affected.

2.12. UAL provided information concerning UAL7: UAL7 from KIAH to RJAA ended up being the only United flight that required an unplanned stop due to the risk of volcanic ash. UAL7 was released on the same initial PACOTS F routing as AAL175 that crossed 180E at 42N latitude, UAL7 was airborne at 1604UTC. After reviewing re-route options and fuel reserves, and the latest VAAC information from Tokyo, the decision was made to make a technical stop at KSFO for fuel and operate via the revised PACOTS F track crossing 180E at 37N latitude. This resulted in a delayed arrival at Tokyo of 2 hours and 28 minutes.

2.13. It was fortunate that this situation was almost identical to the scenario used in February for the VOLKAM13 Volcanic Ash Exercise, and this Dispatcher was the AAL participant in that exercise. The difference in timing of the event (being earlier in the operating day for the US westbound departures) made preplanning most of the flights to avoid the forecasted area of ash possible.

2.14. Attachments include a description of the events from the Flight Crew perspective, the impact to UAL operations, and a response from the Tokyo Volcanic Ash Advisory Center.

1. Action by the Meeting

3.1 The meeting is invited to:

a. review the information contained in this Working Paper; and

b. discuss the information provided in this Working paper as it relates to communication between the various stakeholders.

AAL175 Captain's Feedback

--For the most part the reroute went OK. There were some things that should be discussed though. From beginning to end the process took around 1.5 hours to accomplish for the crew. Mostly, that was due to checking and double checking that all data was entered correctly and that we were in fact flying the clearance that was requested and it was entered accurately in the navigation data base. Initially the airplane computed an arrival fuel of around 5.5 at NRT. Wind updates to the computer and direct routings and a strict scrutiny of best winded altitudes on a leg by leg basis yielded some better efficiencies that resulted in an arrival fuel of around 17K.--

--The SELCAL: Dispatch called around TO plus 1 hour with the information about "a volcano and its effects in Kamchatka" after a meeting/conference call with the FAA; this added gravity to the importance of the call to us—

--Although 1200 miles or so from our planned track the impact was more accurately going to impact our enroute and emergency alternates if we had to divert, this was our larger concern in this decision process.--

--So when Dispatch ran the fuel numbers and said that we would be marginal, it made the decision more difficult but eventually became clear that Russia west of Kamchatka was the best course of action for our flight. We agreed to change course and Dispatch sent the new flight plan data, and I assumed that also included timely reroute coordination with the FAA directly. That did not happen. I do realize that it is a process and it sometimes takes a little while to complete.--

-- ATC did an excellent job when we explained the situation and need to refile. They immediately requested the FULL route which took several minutes of valuable radio time at the expense of other flights needing to talk to ATC. They did a flawless job to get this inputted quickly and accurately. --

--With the initial turn towards GTF we also received some great advice from Dispatch about a more direct course over YXC that saved some additional time and more importantly, fuel. ATC didn't have a good awareness of where we were trying to go and had to coordinate with Canadian ATC to go direct to YXC. From that point ATC cooperated with several directs through Alaska that were wind advantageous to the Russian airspace entry point. By then our fuel computations and estimates began to firm up and give us a more favorable picture of what to expect on arrival. We made our redispatch fuel requirement by over one thousand pounds and the weather remained good in NRT. We replotted the chart to reflect the new reroute again checked that the data entry was correct and then checked the manuals for any procedural changes for operating in Russian airspace as I had not be up there for a few years.--

--Russian ATC communications were spotty. The controllers had good language skills but the radio transmission quality near the entry point was not good and compounded communications difficulties initially. It progressively became better the further south we traveled. Approach and landing into NRT was smooth and efficient without complications. –

UAL Feedback

- United had 22 flights from North America to Asia that were reviewed and could have been affected by the Volcanic eruption of Klyuchevskoy on October 16.

- UAL7 from KIAH to RJAA ended up being the only United flight that required an unplanned stop due to the risk of volcanic ash. UAL7 was released on the same initial PACOTS F routing as AAL175 that crossed 180E at 42N latitude, UAL7 was airborne at 1604UTC. After reviewing re-route options and fuel reserves, and the latest VAAC information from Tokyo, the decision was made to make a technical stop at KSFO for fuel and operate via the revised PACOTS F track crossing 180E at 37N latitude. This resulted in a delayed arrival at Tokyo of 2 hours and 28 minutes.

- I believe the fact that a decision was made to re-issue the PACOTS tracks by Oakland to be more southerly contributed to keeping the majority of traffic free of any forecast VA covered in the 16/1158Z Tokyo VAAC Advisory. All our west coast LAX and SFO departures were able to be planned on the revised PACOTS tracks E and F at or south of 38N180E. UAL875 from KSEA to RJAA operated on the revised Track C (40N180E). UAL139 KDEN to RJAA operated via PACOTS E. UAL869 KSFO-VHHH and UAL889 KSFO to ZBAA operated via Russian Trans East (normal for UAL889).

- Our KORD, KIAD, and KEWR flights to Asia all operated via Russian Trans East or Cross Polar, mainly due to more optimum routings than NOPAC.

- The Volcanic Ash concerns also affected ETOPS alternate selections in the North Pacific and as such we utilized Midway (PMDY) as the primary mid-ocean alternate for the PACOTS 777 flights.

In summary we were fortunate that only one flight (UAL7) was affected with an unplanned stop. We did however plan most PACOTS flights conservatively based on revised PACOTS generation and the Tokyo VAAC Advisory. In retrospect, the UAL7 probably could have continued on the initial route, but that is “after casting” and what is done is done.

The Tokyo VAAC Advisory at 16/1158Z became the critical information that resulted in the revision of the PACOTS Tracks and ultimately how most operations were planned.

The 16/1800Z Advisory from the Anchorage VAAC provided an update that indicated the threat of VA would be minimal. The actions and communications among the stakeholders (VAACs, Oakland Center, FAA ATCSCC, and operators were timely and informative.

The accuracy of VA Forecasts continues to be the primary component in the operations during these events. Similar to American Airlines discussions with their weather vendor, WSI, United also had similar discussions with WSI, also our weather vendor.

Tokyo VAAC Feedback

Regarding the VAA/VAG 2013/28 issued at 1158Z, we recognized the ash cloud was very sparse and about to dissipate then.

In fact it was not discernible from MTSAT-2 imagery at 1115Z.

However, we decided to issue VAA because we recognized Kliuchevskoi had been emitting volcanic ash by monitoring a web camera of KVERT, as well as we could detect the ash cloud from the latest NOAA imagery at 1010Z.

Steve's summary has illustrated the forecast in VAA/VAG 2013/28 impacted the decision making on route planning.

Though we intended to issue a final VAA advising the dissipation at 1800Z, the model output used in the advisory 2013/28 predicted the strong upper wind would sweep the ash cloud far away downstream and blow it up to FL320.

We understand it would have been better if we could cut down on the forecast area of ash contamination where its concentration was estimated to be low.
While we have this issue under consideration, it should be noted for the time being we will take as conservative option as in this case.

In spite of our initial intension to advise dissipation at 1800Z, eventually we handed over the responsibility to VAAC Anchorage in response to request from them.

The handover lead to VAA/VAG 2013/004 issued by VAAC Anchorage at 1800Z, which copied the forecast ash cloud depicted in our previous advisory instead of advising dissipation.

This experience would contribute to future improvement of collaboration procedures between the two VAACs.